Cities: Air Pollution, Heat and Health

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http://wwwghcc.msfc.nasa.gov/urban/urban_heat_island.html

This collaborative study is investigating the relationships between heat (heat island effect), air pollutants, and cardio-vascular,stroke and respiratory diseases in the urban environment.

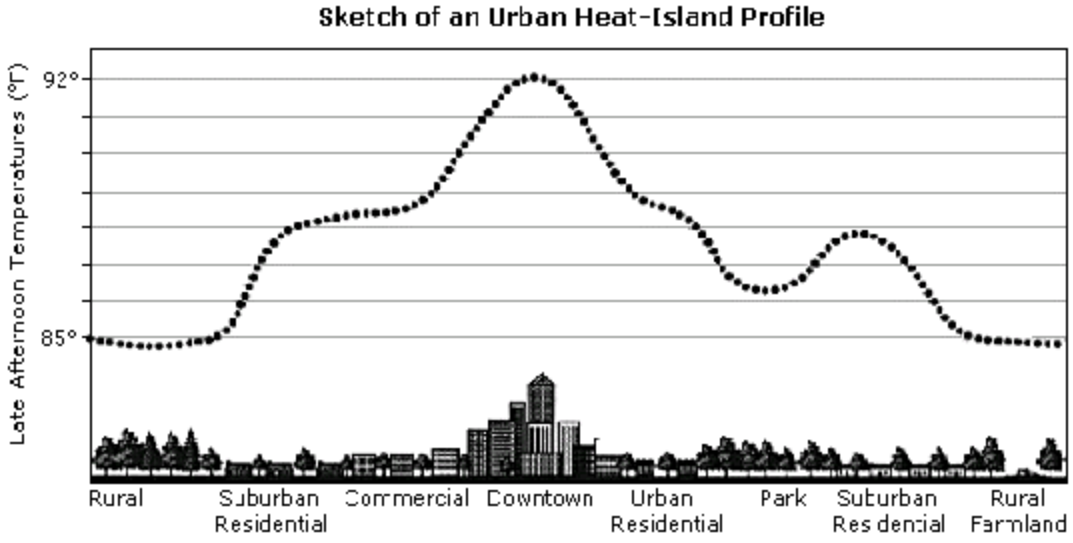


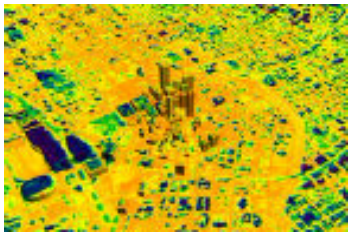
Image Source: Courtesy of Marshall Flight Space Center

The urban heat island is a dome of higher air temperatures above the city. The heat island is a major contributor to ozone production and affects local and regional weather. Using Atlanta, Georgia, as a study area, this research provides a better understanding of how urbanization of affects local and regional meteorology and air quality. With a specially outfitted Lear Jet, NASA researchers collected thermal data about the Atlanta metro area. That aircraft data is lined up with a larger image, taken from the orbiting Landsat 5 satellite. The image starts in "natural" color and immediately transitions to a daytime temperature reading, with white and red indicating highest temperatures, respectively, and blues indicating cooler temperatures. Notice how the buildings themselves help keep small areas cool, casting shadows across the pavement and walls of surrounding structures. As the city rotates, the data fades to a nighttime reading. Using the same color scale, you can see how much heat remains locked in the developed areas of the city, a

phenomenon that becomes instantly apparent as the picture zooms out again to show the long stripe of data draped across the terrain.

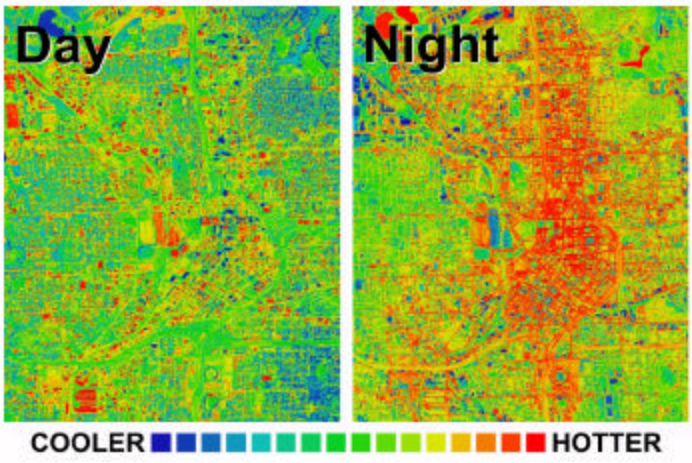

True Color


Thermal Day


Thermal Night

ATLANTA SPREADS OUT AND HEATS UP
For credits and larger images visit:
http://svs.gsfc.nasa.gov/imagewall/AAAS/atlanta.html

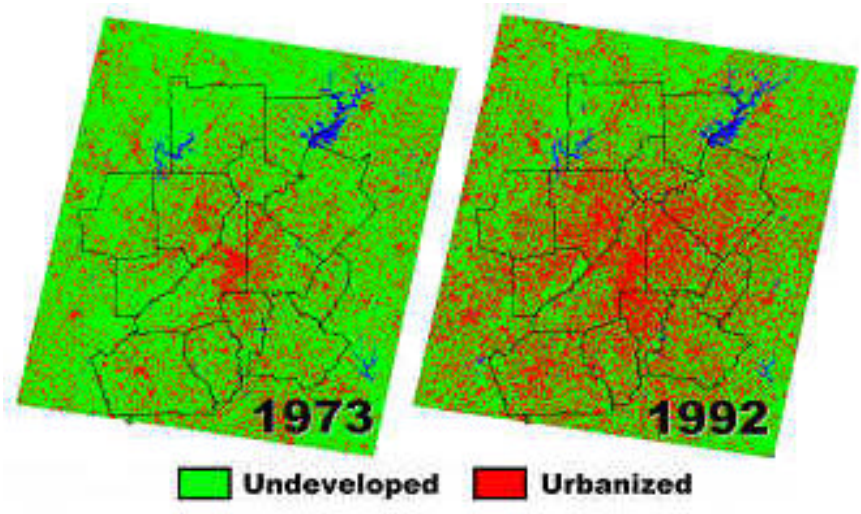
High Resolution Thermal Data For Surface Heat Detection



Thermal infrared aircraft data provide comparison of daytime and nighttime surface temperatures in downtown Atlanta.

Benefits to People:

- Translation of project's science results to Atlanta urban planners and decision makers.
- Development of measures to mitigate heat island effects such as planting trees and increasing reflectivity of urban surfaces.
- Work with the National Institute of Environmental Health Sciences, National Center for Environmental Health and others to assess the impacts of the urban heat island and air quality on human health.



Land Use Change Affects the Magnitude of the Heat Island
Forestland decreases 380,000 acres. Residential land increases by 370,000 acres.
(NASA Landsat data)

Partners:

- NASA/Ames Research Center
- National Center for Environmental Health/Centers for Disease Control and Prevention
- National Institutes of Environmental Health Sciences
- Department of Environmental and Occupational Health, Rollins School of Public Health of Emory University
- Program on Health Effects of Global Environmental Change, Department of Environmental Health Sciences, Johns Hopkins School of Public Health

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